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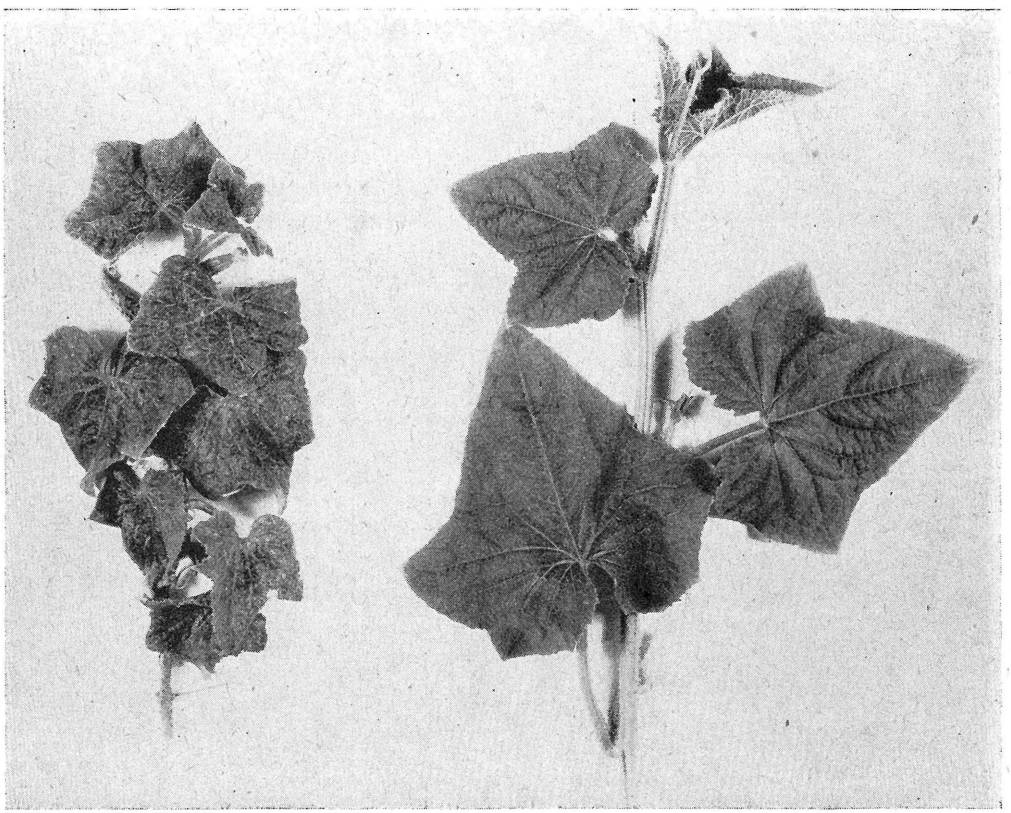
OHIO MR17

● *A New Mosaic Tolerant Pickling Cucumber*

J. D. WILSON



OHIO AGRICULTURAL EXPERIMENT STATION
WOOSTER, OHIO

BIBLIOGRAPHY

1. Munger, H. M. 1950. Two new mosaic-resistant cucumbers. Farm Res. 16 (4): 13.
2. Wilson, J. D., and J. J. Wilson. 1944. A mosaic-tolerant, pickling-type cucumber. Ohio Agr. Exp. Sta. Bimo. Bull. 29 (227): 110-113.

Stock seed of Ohio MR17 has been released to several interested seed companies, and seed should be available for general use by 1952. Those who wish further information concerning the variety may obtain it by writing to the Department of Botany and Plant Pathology, Ohio Agricultural Experiment Station, Wooster, Ohio.

ON THE COVER . . . . . Cucumber vine tip on the left is deformed as a result of mosaic infestation. Tip on right is normal.

Ohio MR17

A New Mosaic-tolerant Pickling Cucumber

J. D. WILSON[1]

In an earlier publication dealing with cucumbers, Wilson and Wilson (2) reviewed the history of losses in production occurring in Ohio and elsewhere that could be attributed to mosaic. They also listed the studies and breeding work being carried on in Ohio in an effort to develop a mosaic-tolerant variety of cucumber. Ohio 31, introduced as a mosaic-tolerant, pickling-type cucumber in 1944 (2) did not prove desirable in commercial plantings, since a rather large percentage of the immature green fruit exhibited elongated cavities in the seed-producing portion of the fruit. As a result, the variety did not process satisfactorily, especially in the dill size. In spite of this defect, Ohio 31 has been comparatively popular with home gardeners, chiefly because of its ability to survive and produce cucumbers over a longer period each season than do most of the mosaic-susceptible varieties, especially if mosaic is present.

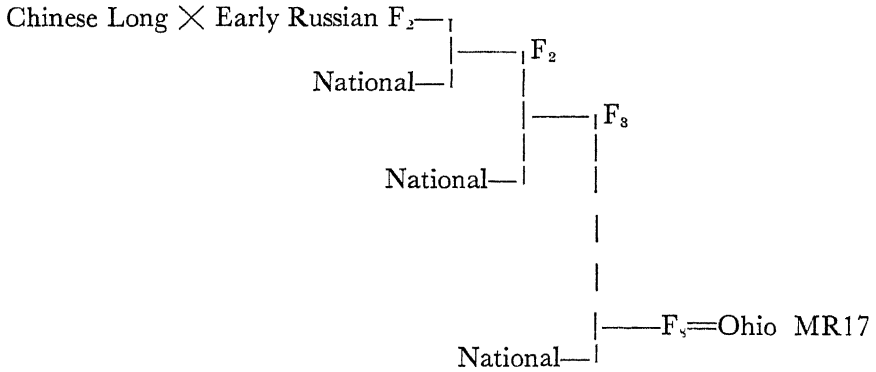
In 1945, Burpee Hybrid was offered to the trade. This hybrid has excellent mosaic resistance, but the fruit produced is too long for use by the commercial pickle industry. Yorkstate, introduced by Munger (1) of the Cornell Experiment Station in 1948, has gained considerable popularity in the principal cucumber growing regions where mosaic is a serious disease.

In the development of Ohio MR17, Early Russian was crossed with Chinese Long. The resistant F_2 selections were crossed with National and then later twice backcrossed with National. The original cross, the cross with National, and the first backcross were made by Munger (1), who then gave this breeding line, which was in the F_3, to O. S. Cannon[2]

[1]In cooperation with C. A. John, head, Crop Research Department, H. J. Heinz Co., Bowling Green, Ohio.

[2]Dr. O. S. Cannon, Pathologist, Utah Agric. Exp. Station, Logan, Utah, formerly with the H. J. Heinz Company at Bowling Green, Ohio.

at Bowling Green, Ohio. Cannon made another backcross to National, and also made subsequent selections in the first four generations of the third backcross. The pedigree to date is as follows:



In the F_3 of the third crossing with National, a selection was made from the resultant progeny which was eventually to become Ohio MR17, and the seed that will be planted in 1951 is in the F_5. Careful inbreeding by hand pollination has produced a homozygous stock. Each generation, after the first, has been inoculated from one to four times with inoculum[3] prepared from blending cucumber virus strains Nos. 1 and 2.

Ohio MR17, a black-spined type, is approximately equal in warting to National, but it is a darker green and produces a somewhat longer fruit. The comparative shape, length, and appearance of fruits of the two varieties is shown in Figure 1. The flesh of Ohio MR17 is thick and the seed cavity proportionately small. Mature fruits are yellowish mahogany in color. The vine is vigorous and resembles that of National closely, except that it is often a darker green in color. This difference in color is accentuated whenever mosaic is prevalent.

During the summer of 1950, approximately 1,600 vines of both National and Ohio MR17 were measured at Wooster. At the time the average vine length of National was 16.9 inches, Ohio MR17 averaged 19.3 inches. Pickings of the two varieties started at about the same time at Bowling Green in 1950, and the same was true at the Wooster test plot. It is possible, however, that with heavy nitrogen fertilization Ohio MR17 may mature somewhat later than National. In each of the last three years, 1948-1950, inclusive, varieties susceptible to mosaic produced little marketable fruit after September 1, whereas it was not uncommon to find good fruits on plants of Ohio MR17 when frost ended the picking season about October 1.

[3]Inoculum prepared from tobacco leaves furnished by Dr. S. P. Doolittle, U. S. Dept. of Agriculture, Beltsville, Maryland.

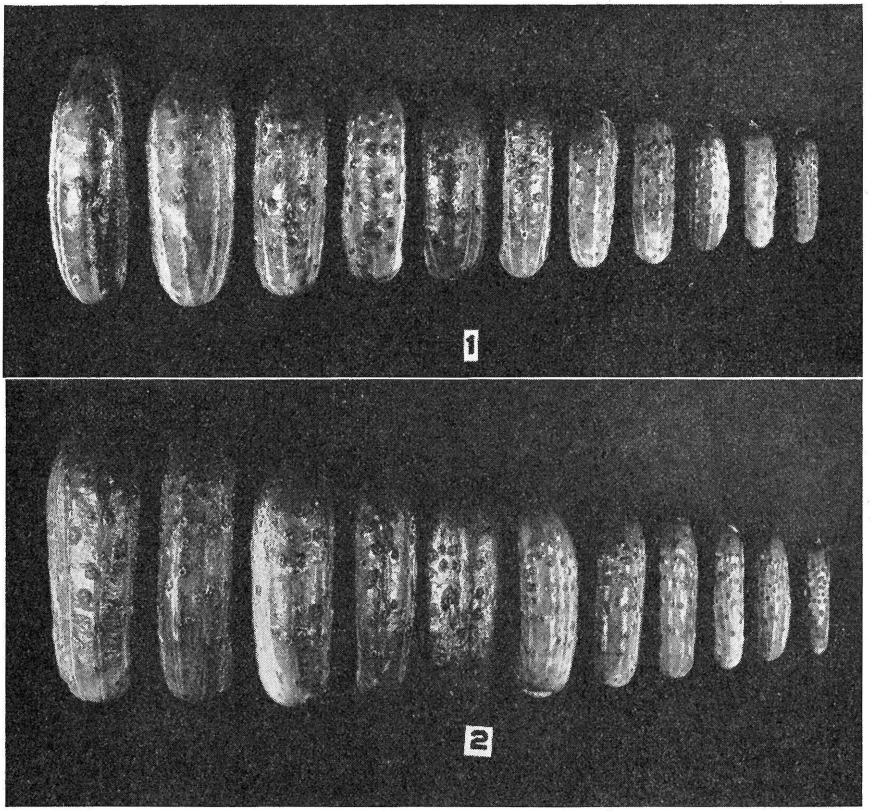


Fig. 1. Comparative shape (length and width) and general appearance of National (1) and Ohio MR17 (2) cucumbers in the pickling-size range.

One of the commercial criteria of a good pickling cucumber is the ratio of length to diameter. This value generally is considered to be about 3:1. Fruits of Ohio MR17 came close to this ratio in the smaller sizes. About 60 percent of the fruits examined in 1950 were in commercial grades 1 and 2 (up to 1⅛ inches in diameter), 20 percent in grade 3 (up to 1⅜ inches), 15 percent in grade 4 (up to 1⅞ inches), and the remaining 5 percent in grade 5 (not over 2 inches in diameter).

Some of the data relative to comparative yields of Ohio MR17 and National at Wooster in 1950 are given in Table 1. These data show that Ohio MR17 produced 36.2 percent more fruits than did National. On a weight basis, Ohio MR17 exceeded National by 91 percent. The difference in favor of Ohio MR17 was even greater when only mosaic-free pickles are considered, since 29.5 percent of the fruits of National

were affected rather severely with mosaic, whereas only 4.3 percent of those produced by Ohio MR17 showed any mottling. Furthermore, it was unusual to find a fruit of Ohio MR17 so seriously damaged by

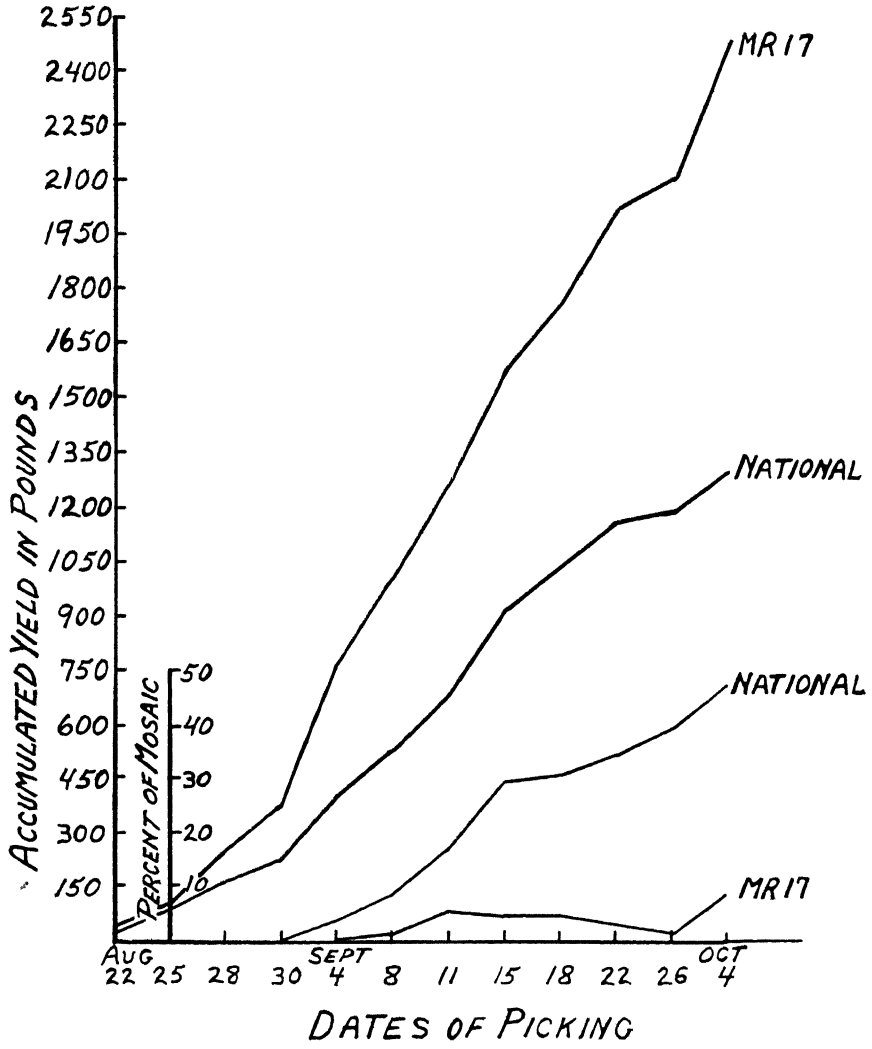


Fig. 2. Cumulative yields of National and Ohio MR17 in upper portion on scale of 0 to 2550 pounds, and the relative increases in the percent of fruits affected with mosaic in National and Ohio MR17 as the season advanced in lower portion on scale of 0 to 50 percent.

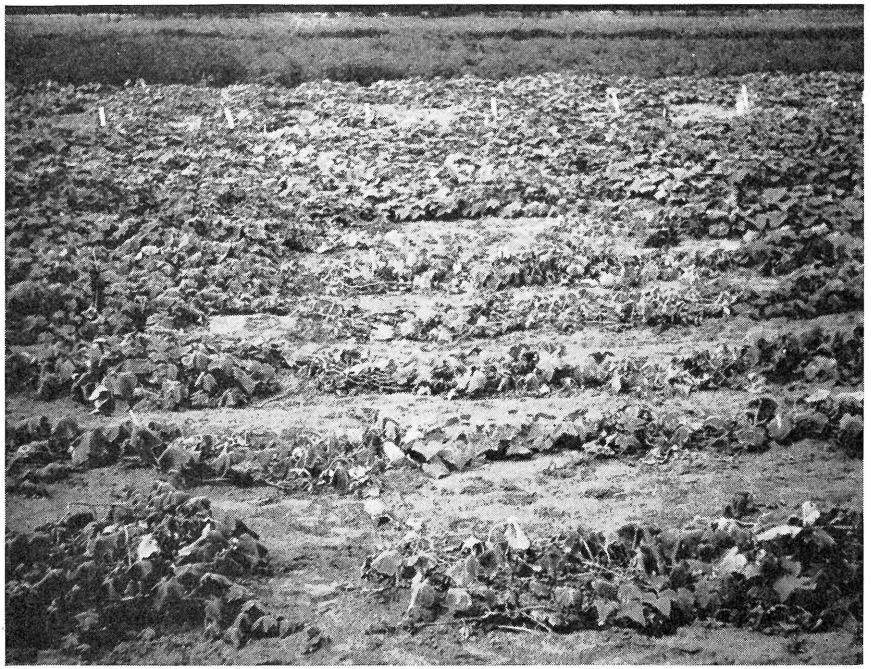


Fig. 3. Comparative health of vines of National (center) and Ohio MR17 (both right and left ends) under conditions of heavy mosaic infection. National vines are light-colored and partially dead.

mosaic that it had to be classed as a cull. In contrast, a considerable percentage of the mosaic-affected fruit of National were sufficiently off color, deformed, or mottled to be graded as unmarketable.

TABLE 1. Comparative Yields and Percentage of Fruits With Mosaic for Ohio MR17 and National at Wooster in 1950

Variety	Number of fruits per 100 hills	Weight of fruit per 100 hills	Yield in tons per acre	Percentage of fruits with mosaic
Ohio MR17	4700	784	7.84	4.3
National	3450	410	4.10	29.5

Comparative cumulative yields of fruit in successive pickings are shown in the upper portion of Figure 2 for both Ohio MR17 and National. Ohio MR17 began to produce a greater weight of pickles than did National with the third picking, and the difference between the two varieties became increasingly greater with each successive picking, until the end of the harvest on October 4. The possibility of a larger

yield of Ohio MR17 over National was first indicated by the fact that the vines were approximately 2½ inches longer than National on August 4, and finally by the much better foliage condition of Ohio MR17 at the end of the season (October 4). The difference in foliage health existing between the two varieties about the middle of the harvest season at Bowling Green in 1950 is illustrated in Figure 3.

The fruits of National are commonly much more severely deformed and mottled by mosaic than are Ohio MR17. In addition to this, the disease appeared earlier on National than on Ohio MR17 and developed much more rapidly as the season advanced, as is shown graphically in the lower portion of Figure 2.

National and Ohio MR17 have been compared in various ways for a period of three years (1948-1950, inclusive). In 1948, the latter produced 59 percent more fruits than did National, 160 percent more in 1949, and 82 percent more in 1950. The data for 1950 are shown in Table 2. At Bowling Green in 1948, about 93 percent of the fruits of Ohio MR17 were marketable, whereas only about 40 percent of those produced by National were suitable for sale. With careful picking it was found that the percentage of fruit in each commercial grade was not significantly different for the two varieties. Furthermore, the data of Table 2 show that the average weight per fruit harvested in 1950 was approximately the same in both instances.

TABLE 2. Comparative Yields of Ohio MR17 and National at Bowling Green in 1950

Variety	No. of fruits	Wt. of fruit	Yield in tons per acre	Average wt. per fruit harvested
		Pounds	*Tons*	*Ounces*
Ohio MR17	1415	130.7	5.88	1.55
National	777	69.8	3.14	1.64

Much painstaking care was devoted to the development of a solid, immature green fruit. In doing this, every plant exhibiting fruit with any hollowness was discarded. It has been shown that the tendency toward hollowness is inherited, and also that environmental conditions are an important factor in the development of unsound fruit. In 1950, a large number of fruit of Ohio MR17, grown on the Heinz farm at Bowling Green, and of Davis Blend from commercial fields in the same general area, were examined. Ohio MR17 averaged about 7 percent unsound fruits whereas Davis Blend averaged about 11 percent unsound. Large scale tests of processing quality have been made with Ohio MR17, and the results have been satisfactory.